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(19)

(54) DEVICE FOR CLEANING THE COOLING OIL FOR SPRAYED OIL COOLED ELECTRICAL MACHINES

(71) We, LICENTIA PATENT-VERWALTUNGS-GMBH, of 1 Theodor-Stern-Kai, 6 Frankfurt 70, Federal Republic of Germany, a German Body Corporate, do

hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to a device for cleaning the cooling oil for oil spray cooled rotary electrical machines, particularly generators, in vehicles using the oil present for lubrication and cooling.

According to the invention, there is provided a device for cleaning the cooling oil for oil spray cooling of rotary electrical machines, said device comprising a hollow shaft adapted to receive the rotor of an electrical machine, a centrifugal separator provided in said hollow shaft, and a series of spray nozzles extending radially from the shaft for delivering cooling oil in the form of a spray to the machine, wherein the centrifugal separator has a turbulence nozzle rotating with the hollow shaft at the input end of said separator, said nozzle comprising at least one first opening which is inclined to the axis of rotation of the shaft and a central second opening arranged coaxially with respect to the shaft axis through which cleaned oil for spraying is passed from the separator to the spray nozzles.

The invention will now be further described, by way of example, with reference to the drawing, the single figure of which is a sectional view showing one embodiment of a device according to the invention embodied in a generator.

An oil spray cooled, brushless 3-phase current generator will be described as example. A lamination stack 2 having a main stator winding is contained in a housing 1. A field winding 3 of an exciter and a stator winding 4 of a permanent magnet generator are arranged on the right and on the left respectively next to the main stator winding. A stack of main rotor laminations 7 with a field winding, a stack or rotor laminations with a winding 8 of the exciter and a permanent magnet rotor 10 are mounted on a hollow shaft 6 which is adapted to receive these components. Exciter diodes 9 are secured to the exciter rotor. The hollow shaft 6 is supported in a bearing 11 on the non-driven end of the generator. Cooling channels in the housing 1 are given the reference numeral 5. In accordance with the invention a centrifugal separator 12 is provided at the passage of the cooling oil from the housing into the rotor.

The cooling oil operation is as follows:

The total cooling oil enters the housing at a connection 13 and runs round in the housing in a helix in known manner. On leaving the housing it enters a tube 14 which conveys it to the end of the shaft 6 where it enters the centrifugal separator 12 by means of openings 15 distributed at the periphery of a turbulence nozzle. The openings 15 are outwardly inclined with respect to the axis of the hollow shaft 6 so that the oil is put into a circulation flow which centrifuges the dirty parts outwardly so that in the centre the clean oil is drawn off through central opening 16 in the turbulence nozzle and is guided through a channel 17 into the hollow shaft to openings 18 in the form of spray nozzles from where it is sprayed for cooling.

The dirty part of the oil is conducted further in the conically constructed centrifugal separator 12, wherein the cone must be constructed as flatly as possible so that the dirty parts are carried further because of the flow. The dirty oil is then guided through the hollow shaft 6 to an outlet 19 in a pinion. The cooling oil sprayed in the inner space of the generator is led away by means of a channel 20.

In the case of a sufficient quantity of

primary oil being available, it is also conceivable to connect two centrifugal separators one after the other.

WHAT WE CLAIM IS:—

1. A device for cleaning the cooling oil for oil spray cooling of rotary electrical machines, said device comprising a hollow shaft adapted to receive the rotor of an electrical machine, a centrifugal separator provided in said hollow shaft, and a series of spray nozzles extending radially from the shaft for delivering cooling oil in the form of a spray to the machine, wherein the centrifugal separator has a turbulence nozzle rotating with the hollow shaft at the input end of said separator, said nozzle comprising at least one first opening which is inclined to the axis of rotation of the shaft and a central second opening arranged coaxially with respect to the shaft axis through which cleaned oil for spraying is passed from the separator to the spray nozzles.

2. A device for cleaning the cooling oil for oil spray cooling of rotary electrical machines, said device being substantially as described herein with reference to the accompanying drawing.

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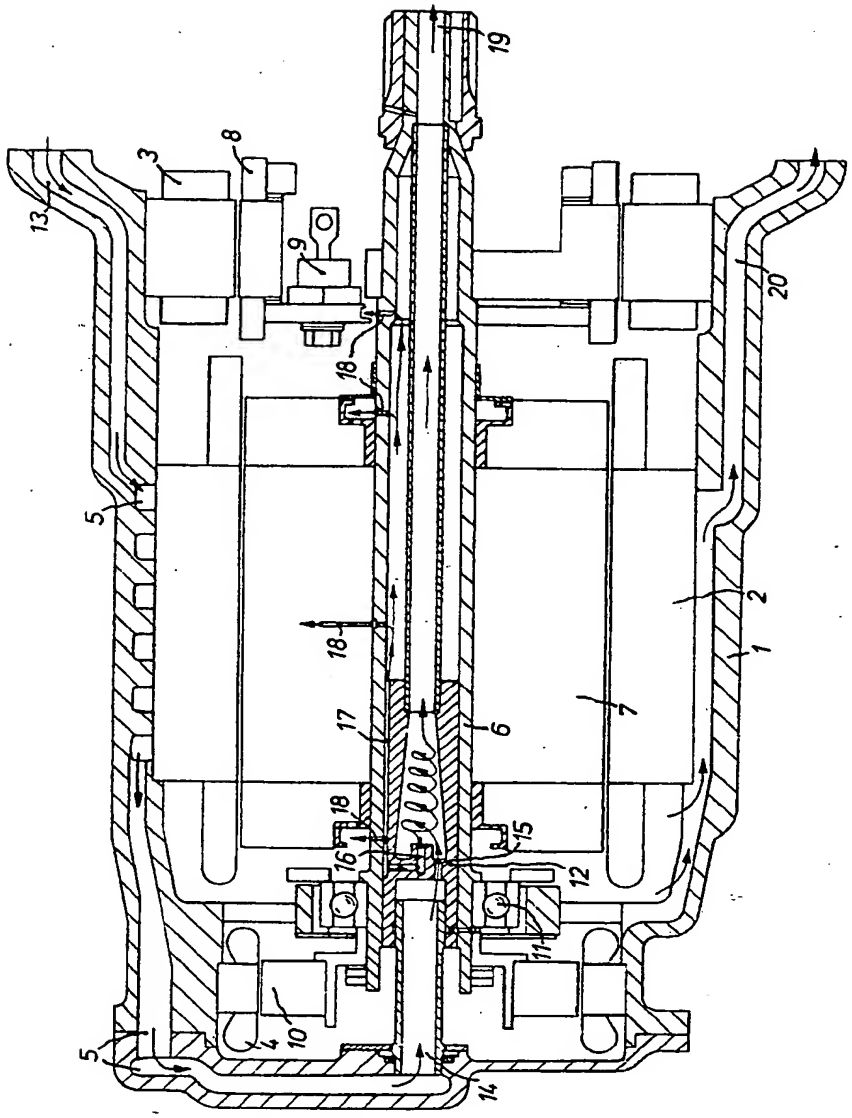
1 SHEET *This drawing is a reproduction of the Original on a reduced scale*



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